



IB

Energy, Power and Climate Change



page 1

1. Many power stations produce CO_2 . Which one of these does not?

- A. Coal
- B. Oil
- C. Nuclear
- D. Biomass

2. Which one of these statements is true?

- A. Continuous conversion of thermal energy into work in a cyclical process can be 100% efficient.
- B. Degraded thermal energy can be used to produce useful work.
- C. The efficiency of a powerstation is typically 60-70%.
- D. Electrical energy is generated by rotating coils in a magnetic field in a generator.

3. 'Energy density' is defined as

- A. the fraction of total energy available by combustion
- B. the energy per unit volume
- C. the energy per unit mass
- D. the total energy available per mole

4. Which of these answers correctly describes the uses and properties of the 3 fossil fuels?

	Most used worldwide in electricity generation	Highest efficiency in a power station
A.	gas	oil
B.	oil	coal
C.	coal	gas
D.	oil	oil

5. Photovoltaic cells are not in widespread use. Which one of these is **not** a reason for this

- A. High start-up costs
- B. Low output per square meter
- C. Inefficient
- D. Lack of available suitable locations worldwide

6. Which of these answers correctly describes the transportation and storage problems associated with fossil fuels?

	Easiest to store on site	Easiest to transport
A.	coal	oil
B.	oil	coal
C.	coal	gas
D.	oil	oil

7. The output of a solar panel in Norway is less than that in Egypt because

- A. There are less total daylight hours over a year.
- B. The intensity of radiation is less.
- C. the solar constant is lower in Norway.
- D. The albedo of the Earth is greater in Norway.

8. A hydroelectric scheme converts

- A. gravitational to kinetic to electrical energy
- B. kinetic to electrical energy
- C. gravitational to mechanical energy
- D. kinetic to gravitational to electrical energy

9. Which of these energy resources has the Sun as the original energy source?

- A. geothermal
- B. tidal
- C. wave
- D. nuclear

10. Which of these is a popular design for a land-based wave power generator?

- A. A horizontal-axis plant (HEP)
- B. An oscillating water column (OWC)
- C. A fixed wave platform (FWP)
- D. A hybrid wave generator (HWG)

11. A wind generator can never be 100% efficient because

- A. air cannot stop moving behind the turbine blades
- B. the generator must be switched off in high wind speeds
- C. some air will hit the generator support
- D. some air will pass underneath the



blades

12. A sea wave of length l , amplitude A and velocity v produces a maximum power output of P . if the wave increase in strength to have a velocity of $3v$, amplitude of $4A$, then the power for an identical length will be

- A. $7P$
- B. $12P$
- C. $36P$
- D. $48P$

 ?

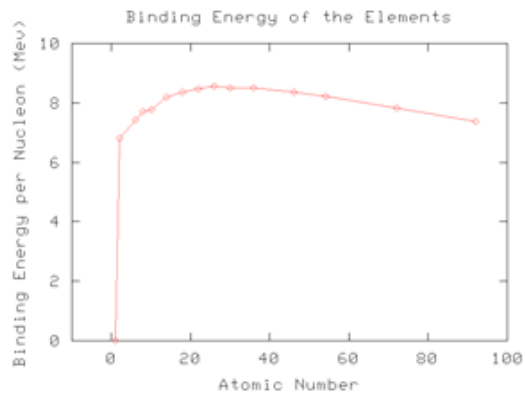
13. A horizontal axis wind turbine of radius r is producing power with a wind speed of velocity v . In theory, if the wind speed AND radius of the turbine are both doubled, the power output will be increased by a factor of

- A. 64
- B. 32
- C. 16
- D. 8

 ?

14. The graph shows the binding energy per nucleon for different atomic numbers. Which element has the highest binding energy per nucleon?

- A. Uranium
- B. Hydrogen
- C. Iron
- D. Aluminium


 ?

15. When using the formula $E=mc^2$ it is common to use units of MeV c^{-2} . This is a unit of

- A. mass
- B. energy
- C. velocity
- D. power

 ?

Save and move on